Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GERD KOSTER,
WINFRIED MOLL,
and
SIEGFRIED SCHLUTER

Appeal No. 2000-1333
Application No. 08/691,988

ON BRIEF

Before COHEN, STAAB, and McQUADE, Administrative Patent Judges.

McQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Gerd Koster et al. appeal from the final rejection of claims 1 and 3 through 5, all of the claims pending in the application. We reverse.

THE INVENTION

The invention relates to a heating sheet bundle for use

in

a regenerative heat exchanger. Claim 1 is illustrative and

reads as follows:[1]

> 1. A heating sheet bundle adapted to be mounted tangentially or radially in trapezoidally segmented cells of a heating surface carrier of a regenerative heat exchanger with stationary or revolving storage masses, the heating sheet bundle comprising a plurality of profiled sheets mounted so as to be placed against each other and forming flow ducts therebetween, wherein at least two outer profiled sections on at least two oppositely located sides of the bundle are constructed as a pair of profiled sheets connected in a sandwich-like manner so as to be dimensionally stable, wherein one of the profiled sheets of the pair of profiled sheets is undulated and another of the profiled sheets of the pair of profiled sheets is corrugated, each sheet having a rolling depth, and wherein the rolling depth of the undulated sheet is greater than the rolling depth of the corrugated sheet.

THE PRIOR ART

The references relied upon by the examiner as evidence of

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[1]Contrary to the statement on page 2 in the examiner's answer (Paper No. 22), the copy of claim 1 in the appendix to the appellants' brief (Paper No. 21) is not correct because it reflects the amendment filed October 13, 1998 (Paper No. 12) which has not been entered. The record shows that the examiner refused entry of the amendment when it was filed (see the advisory action dated November 4, 1998, Paper No. 14) and that the appellants did not direct that it be entered in their subsequently filed request for a continued prosecution application (Paper No. 15).

obviousness are:

Woolard et al. (Woolard)	3,379,240	Apr. 23, 1968
Hubble	3,532,157	Oct. 6, 1970
Adrian	4,182,402	Jan. 8, 1980

THE REJECTIONS

Claims 1, 3 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Adrian in view of Hubble.

Claim 5 stands rejected under 35 U.S.C. § 103 as being unpatentable over Adrian in view of Hubble and Woolard.

Attention is directed to the appellants' brief (Paper No. 21) and to the examiner's answer (Paper No. 22) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.

DISCUSSION

Adrian, the examiner's primary reference, discloses "a rotary regenerative air heater or economizer which is mounted coaxially inside a flue duct, having a stack of heater lamellae packages which are alternatingly in contact with the hot flue gas and with the counter-flowing cold air which is to be heated" (column 1, lines 7 through 12). Each lamellae package 12 constitutes a heating sheet bundle which is adapted to be mounted in trapezoidally segmented cells of the heat exchanger stack 1 (see Figure 2). The packages 12 essentially consist of alternating flat and undulating panels of sheet metal (see column 4, lines 63 through 68) held together by

flat-iron mounting

brackets 13 and tie rods 13c (see Figure 3) or by guide screen panels 14 and tie rods 16 (see Figure 4).

Given their alternating flat and undulating panel construction, Adrian's heating sheet bundles 12 fail to meet the limitations in claim 1 requiring (1) a plurality of profiled sheets mounted so as to be placed against each other, and (2) pairs of profiled sheets on opposite sides of the bundle wherein one of the paired profiled sheets is undulated and the other is corrugated with the rolling depth of the undulated sheet being greater than the rolling depth of the corrugated sheet. The examiner's reliance on Hubble to cure these deficiencies is not well founded.

Hubble discloses a rotary heat exchange regenerator having a spirally wound heat transfer disk or matrix. Hubble's disk is designed to avoid failures caused by commonly occurring temperature differentials between the colder outer rim of the disk and the hotter inner region. As explained in column 1 of the reference, conventional disks comprise alternating flat and corrugated metal strips which are spirally wound and brazed together. "Although the corrugated strip can give, the flat strip between the layers of

corrugated strip is substantially unyielding. Thus, when the interior of the matrix becomes hotter than the outer zone, high hoop stresses are set up in the flat strips of the outer part of the matrix" (column 1, lines 41 through 45). These hoop stresses produce yielding, cracking, and ultimately failure of the disk. Hubble's solution is to eliminate or minimize the hoop stresses and their attendant failures by replacing the circumferentially unyielding flat strip with a strip capable of yielding or stretching to prevent the high hoop stresses from developing (see column 1, lines 46 through 51). In the embodiment of Hubble's disk shown in Figures 3 and 4, the flat strip is replaced by a corrugated strip. The resulting disk consists of a first strip 37 having relatively large corrugations and a second strip 38 having relatively small corrugations. The corrugations of the first strip are three times as wide and about six times as deep as the corrugations of the second strip (see column 3, lines 17 through 39).

In proposing to combine Adrian and Hubble to reject claim 1, the examiner concludes that it would have been obvious at the time the invention was made to a person having ordinary

skill in the art "to employ in Adrian the profile[d] sheets being brazed together in pairs and the undulated sheet having a greater rolling depth than the corrugated sheet for the purpose of

preventing overstressing and failure resulting from differential thermal expansion as disclosed in Hubble" (answer, page 4).

As pointed out by the appellants, however, the heat exchange structures disclosed by Adrian and Hubble differ substantially in construction. There is nothing in either reference indicating that the heating sheet bundles 12 disclosed by Adrian, which are not spirally wound, would unduly suffer from thermally induced stresses, much less the particular thermally induced hoop stresses targeted by Hubble's spirally wound, brazed matrix. In this light, it is apparent that the examiner has engaged in an impermissible hindsight reconstruction of the appellants' invention by employing the claims as a blueprint to selectively piece together disparate teachings in the prior art.

Consequently, we shall not sustain the standing 35 U.S.C. § 103 rejection of claim 1, or of claims 3 and 4[2] which

[2]The recitation in claim 4 that the profiled sheets comprise vertical outer rods is inconsistent with the underlying disclosure which indicates that these sheets and rods are separate elements. This inconsistency is deserving of correction in the event of further prosecution before the examiner.

depend therefrom, as being unpatentable over Adrian in view of Hubble.

Furthermore, inasmuch as Woolard does not overcome the foregoing flaw in the basic Adrian-Hubble combination, we shall not sustain the standing 35 U.S.C. § 103 rejection of claim 5, which depends from claim 4, as being unpatentable over Adrian in view of Hubble and Woolard.

SUMMARY

The decision of the examiner to reject claims 1 and 3 through 5 is reversed.

REVERSED

IRWIN CHARLES COHEN Administrative Patent Judge	)	
LAWRENCE J. STAAB Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOHN P. McQUADE Administrative Patent Judge	)	

JPM:hh

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